



What is osteoporosis?

Osteoporosis occurs when the struts which make up the mesh-like structure within bones become thin causing them to become fragile and break easily, often following a minor bump or fall. These broken bones are often referred to as 'fragility fractures'. The terms 'fracture' and 'broken bone' mean the same thing. Although fractures can occur in different parts of the body, the wrists, hips and spine are most commonly affected. It is these broken bones or fractures which can lead to the pain associated with osteoporosis. Spinal fractures can also cause loss of height and curvature of the spine.

What is denosumab?

Denosumab is a drug treatment which is used to reduce the risk of broken bones in people with osteoporosis. It is given as a sub cutaneous injection (just under the skin) every 6 months.

Why do I need a drug treatment for osteoporosis and how does denosumab work?

Drug treatments are prescribed if you have osteoporosis and are at a high risk of broken bones. These treatments help strengthen your bones and reduce your risk of having fractures. They do not help the pain that occurs when bones break.

Bone is constantly being broken down (resorption) and rebuilt (formation) by specialist bone cells. This is called bone remodelling. When this becomes out of balance and more bone is broken down than is rebuilt osteoporosis occurs. Denosumab is a monoclonal antibody which inhibits the cells that break down bone (osteoclasts) and as a consequence prevents bone loss. It does this by blocking a protein that is involved in stimulating bone resorption known as RANK ligand. By blocking RANK ligand, denosumab prevents bone loss and thereby reduces the risk of broken bones.

Which products contain denosumab?

Prolia

Dose	60mg subcutaneous injection (under the skin) every 6 months
Licensing details	F M S H

Key

F = Post-menopausal women, **M** = Men

These symbols are a guide to whether drugs are licensed for men or women. Sometimes, however, men will be prescribed drugs licensed for women

S = shown to reduce the risk of broken bones in the spine

H = shown to reduce the risk of a broken hip

GIOP = shown to reduce the risk of broken bones in people who have osteoporosis caused by glucocorticoid ("steroid") medication

A licensed drug has been checked for safety and effectiveness and can be prescribed by a doctor for a specific condition. Sometimes an unlicensed drug will be given at the discretion of your doctor e.g. those licenced specifically for women may be prescribed for men.

How can I get the most out of my drug treatment?

1. Be Informed

Find out about your drug treatment so that you can be involved in decisions being made and you will know what to expect. Talk to your doctor and/or contact the National Osteoporosis Society's Helpline if you have any questions or concerns. If you don't already have a copy of the Patient Information Leaflet which describes how the drug is given and the possible side effects ask for a copy when you are given the injection. It is important that you gather as much information as possible and discuss any worries you may have prior to having the first injection.

2. Make sure you have enough calcium and vitamin D

It is important that you have adequate calcium and vitamin D whilst taking denosumab. Many people take these in supplement form if they are not able to get sufficient calcium from their diet or, in the case of vitamin D, safe sunlight exposure.

3. Make sure denosumab is the treatment for you

There are some conditions or situations which may mean denosumab is not suitable for you. These are:

- A low blood calcium level (hypocalcaemia). This must be corrected by an adequate intake of calcium and vitamin D before starting on denosumab as very rarely denosumab treatment can cause blood calcium levels to drop significantly.
- A rare hereditary intolerance of fructose (a simple sugar found in fruit and vegetables).
- A latex allergy. The needle cover of the prefilled syringe contains dry natural rubber (a derivative of latex).
- If you are pregnant or breast feeding (although only licensed for post-menopausal use, occasionally it may be prescribed by specialists for younger women).

4. Continue to take your treatment regularly and discuss with your doctor the plan for an alternative drug if denosumab is discontinued .

The effects of denosumab wear off quickly 6 months after the last injection, and 'rebound fractures' of the spine have been reported in people who have stopped denosumab and haven't then received an alternative bone medicine. For some people, denosumab might be used for a decade or even longer, but there is no formal guidance about how long the course should be. It is considered good practice for your doctor to review your treatment after a few years for advice about what is best for you based on your individual circumstances. Usually, if denosumab is stopped, you will be prescribed another drug, such as a bisphosphonate, for at least a year to help keep your bones strong. If your risk of fracture is considered to be low you may not need another treatment although some plan to monitor you would still be important. Experts recommend that you are referred to a hospital specialist for assessment and advice if denosumab is going to be discontinued without a follow-on treatment.

Denosumab should not be confused with the bisphosphonates, alendronic acid, risedronate, ibandronate and zoledronic acid which stay in bones, often for a number of years and may continue to help keep bones strong even when you stop taking them. This is why 'pauses' in treatments or 'drug holidays' have sometimes been recommended with bisphosphonates. This is NOT recommended with denosumab.

5. Lead a healthy lifestyle to keep your bones strong

Factors that can help to maintain healthy bones are a well-balanced diet with adequate calcium rich foods,

safe exposure to sunlight to obtain vitamin D, regular weight bearing exercise, avoiding smoking and keeping alcohol consumption within the recommended limits. If you have been diagnosed with osteoporosis and are taking a drug treatment, you may need to boost your calcium intake up to around 1000mg a day. Your doctor can prescribe supplements of calcium and/or vitamin D if you need them.

6. Reduce the risk of side effects

As with any drug, there are potential side effects with denosumab. It is important to remember that:

- Most people will not experience side effects or if they do, they are short lived.
- Not all the symptoms you may read about online or see listed on the patient information leaflet are necessarily caused by the drug. Symptoms that have been reported by patients taking part in the research trials may be included as possible side effects even if they were seen in as many people who took the placebo (dummy treatment) as those taking denosumab. So, common conditions such as aches and pains, coughs, colds and urine infections will often be reported in this way and people may think they are due to their treatment. We can only be sure that such symptoms are likely to be caused by denosumab if they were seen in more patients treated with denosumab than with placebo. The symptoms overleaf are those that can be thought of as "true side effects"
- Some side effects (such as cataract and diverticulitis) were seen in one study in men using denosumab because of their prostate cancer treatment. These side effects were not seen in post-menopausal women using it for osteoporosis. It is therefore unclear whether these are true side effects.

If you are taking medications for other conditions it is important to establish that it is not these that are causing your side effects. Talk to your doctor who may be able to suggest ways of investigating this further. As this drug treatment is given as an injection twice a year, you may worry that you will experience side effects that you can do nothing about because the drug will stay in your body for a long time. Although this is an understandable concern, side effects are generally short lived.

If you experience these or any other symptoms which you think may be due to this medicine, speak with your doctor or pharmacist about other drug treatment options. As more research findings become available more symptoms may be found to be "true side effects" so information could change in the future.

What side effects does Denosumab cause?

Potential side effect	How common was it?	What can I do to reduce the risk of this occurring and what should I do if I experience this problem?
Skin infections leading to hospitalisation (such as Cellulitis)	4 in 1000	You should see your doctor if a patch of skin becomes red, swollen and very tender.
Low blood calcium levels (muscle spasms; twitches or cramps; numbness or tingling in your fingers, toes or around your mouth)	1 in 2000	Occasionally there can be a severe problem with low blood calcium so if you experience these symptoms speak to your doctor immediately. Blood tests prior to each injection are recommended to check that the calcium level in your blood is satisfactory. A repeat calcium test may be necessary two weeks after the injection if your doctor is concerned about your blood calcium levels.

Other health risks associated with denosumab

Osteonecrosis of the jaw	This is an extremely rare jaw problem in which there is delayed healing in the mouth usually following invasive dental procedures. The general advice is to maintain good oral hygiene and receive routine dental check-ups	
Atypical (unusual) thigh bone fracture	This is an unusual and rare type of thigh bone fracture which can occur after long term treatment and as a result of little or no force	
For more information see our factsheets on these very rare conditions.		

The **National Osteoporosis Society** is the only UK-wide charity dedicated to improving the prevention, diagnosis and treatment of osteoporosis and fragility fractures. The Charity receives no Government funding and relies on the generosity of individuals to carry out its vital work.

For osteoporosis information and support contact our Helpline:

 **0808 800 0035**

 **nurses@nos.org.uk**

To become a member or make a donation:

 **01761 473 287**

 **join online at www.nos.org.uk**

To order an information pack or other publications:

 **01761 471 771**

 **info@nos.org.uk**

or download from our website at www.nos.org.uk

For further information on drug treatments for osteoporosis, such as how to decide which drug to take, see our booklet *All about Osteoporosis*. Fact sheets are available on each osteoporosis drug.

This fact sheet is one of a range of publications produced by The National Osteoporosis Society. If you would like more general information about osteoporosis see our booklet *All about Osteoporosis*.

This information reflects current evidence and best practice but is not intended to replace the medical advice provided by your own doctor or other health professional.